

new principle and fact discovered will soon find its economic application. Further, it is necessary that we should obtain as soon as possible a better knowledge of the mineral resources of the smaller and thinly inhabited colonies, protectorates, and spheres of influence. This is one of the things which would conduce to the more rapid, effective occupation of these areas.

With regard to areas not at present British colonies, it seems to me that no great harm would be done by obtaining, not in any obtrusive way, some general knowledge of the mineral resources of likely areas. This at least seems to be what other nations find it worth their while to do, and then, when the opportunity of selection arises, they are able to choose such regions as will most rapidly fill up and soonest yield a return for the private or public capital invested in them.

To sum up, I consider that the time has come when geologists should make a firm and consistent stand for the teaching of their science in schools, technical colleges, and universities. Such an extension of teaching will of course need the expenditure of time and money; but England is at last beginning to wake up to the belief, now an axiom in Germany and America, that one of the best investments of money that can be made by the pious benefactor or by the State is that laid up at compound interest, "where neither rust nor moth doth corrupt," in the brains of its young men.

This knowledge has been an asset of monetary value to hosts of individuals who have made their great wealth by the utilisation of our mineral resources, and to our country, which owes its high position among the nations to the power and importance given to it by its coal and iron. It is surely good advice to individuals and to the State to ask them to reinvest some of their savings in the business which has already given such excellent returns, so that they and we may not be losers through our lack of knowledge of those sources of energy which have made us what we are, and are capable of keeping for many years the position they have won for us.

And in our present revival of education it would be well that its rightful position should be given to a science which is useful in training and exercising the faculty of observation and the power of reasoning, which conduces to the open-air life and to the appreciation of the beautiful in nature, which places its services at the disposal of the allied sciences of topography and geography, which is the hand-maid of many of the useful arts, and which brings about a better knowledge and appreciation of the life and growth of that planet which we inhabit for a while, and wish to hand on to our descendants as little impaired in vitality and energy as is consistent with the economic use of our own life-interest in it.

### NOTES.

THE following have been elected Fellows of the Reale Accademia dei Lincei:—As Ordinary Fellows ("Soci nazionali"), Messrs. J. Dalla Vedova for geography, A. Naccari for physics, C. de Stefani for geology, A. Borzi, J. Fano, A. Maffucci for zoology, pathology, &c. As Corresponding Fellows ("Corrispondenti"), Messrs. P. Pizzetti for mechanics, A. Angeli for chemistry, R. Fusari and A. Stefani for zoology and physiology. As Foreign Fellows, Messrs. D. Hilbert and J. D. van der Waals for mathematics and mechanics, J. Thomson and H. Becquerel for physics, R. Lydekker for geology and palæontology, E. B. Wilson, T. Schlösing, P. Sorauer and F. Marchand for zoology, agronomy and pathology.

THE prizes offered by the Reale Accademia dei Lincei for the present year have been allotted as follows:—Royal prizes have been awarded to Prof. Artini for mineralogy and geology, to Prof. Ghino Valenti for social and economic science, and to the late Prof. Contardo Ferrini for jurisprudence and political science. Of the prizes offered by the Minister of Public Instruction, awards have been made for

physical and chemical science to Profs. Cicconetti and Pierpaoli (jointly), and to Prof. Baggio Lera, and for philology to Profs. Toldo, G. Tambara and V. Ussani. The Carpi prize for botany has been conferred on Dr. Biagio Longo, of Rome. The award of the Royal prize for mathematics has been deferred.

WE have received a copy of the programme of prizes to be awarded in 1904 by the Société Industrielle de Mulhouse. The present publication takes the place of all previous issues, and copies of the programme, in which certain changes have been made, can be obtained on application to the secretary of the society. There are no fewer than fifty-six competitions concerned with chemical technology, more than twenty dealing with the mechanical arts, and twelve with natural history and agriculture. Several prizes are offered with the object of improving and stimulating local industries. The programme also contains full particulars of several large prizes of five thousand francs, which are awarded for scientific work at intervals of in some cases ten, and in others five years.

THE death is announced, at the age of eighty-one years, of the Rev. Maxwell Henry Close, treasurer of the Royal Irish Academy, and author of numerous contributions to the *Proceedings* of the Royal Irish Academy.

VIOLENT earthquake shocks of seventeen seconds' duration are reported by Reuter to have been experienced in Bucharest, Roumania, at 10 a.m. on Sunday last.

AN earthquake is stated in the *Globe* to have taken place in Lisbon at 1.34 p.m. on Monday last. It was of three seconds' duration.

DR. W. H. ALLCHIN is to deliver the Harveian oration at the Royal College of Physicians of London on Monday, October 19. The Bradshaw lecture (the subject of which will be "Some Observations on Tuberculosis of the Nervous System") will be delivered at the college by Dr. E. F. Trevelyan on Thursday, November 5.

A COURSE of lectures on bacteriology for medical men, veterinary surgeons, agriculturists, brewers, farmers, sanitary inspectors, teachers and others is to be given by Dr. F. Bushnell at Plymouth under the direction of the education authority for that town. The lectures will be illustrated by lantern slides, cultures and demonstrations, and it is hoped to make arrangements for a class of practical bacteriology in the future.

AN International Exhibition of Inventions is to be held at Brighton in November next. The object of the exhibition is to afford inventors and patentees an opportunity of bringing their inventions before the notice of capitalists, manufacturers, and users. Awards of gold, silver, and bronze medals will be made for inventions possessing the greatest merit combined with commercial utility.

It has been decided to start a school of colonial medicine at Marseilles, and Surgeon-Major Martine, of the colonial military service, has just been appointed by the French Minister of War to confer with the municipality of Marseilles relative to its establishment.

THE U.S. Consul-General at Frankfort is reported by the *Chemist and Druggist* to have stated that "the city of Düsseldorf will soon have the first academy for practical medicine in Germany, and it will be in connection with the new hospital to be erected." Prof. Witzel, of the University of Bonn, is proposed as director of the academy. The establishment of other similar academies is under consideration.

AN exposition is to be held in Baltimore under the auspices of the Maryland Public Health Association and the Tuberculosis Commission appointed by the Governor of that State, the object of which is to arouse public and professional interest in the subject of tuberculosis. The basis for the exposition will, says the *Lancet*, be the investigations of the Tuberculosis Commission into the cause, the prevalence, and the distribution of human tuberculosis in that State, its influence on the public welfare, and the best methods of restricting and controlling the disease. The medical questions involved, the importance of habits, occupation, and housing conditions will receive consideration. The ultimate purpose of the exposition is to determine the proper legislation, municipal, State, and national, to be recommended, some definite line of prophylaxis, as well as measures relating to the care and cure of both advanced and incipient cases of pulmonary tuberculosis.

It is stated in the *British Medical Journal* that a number of consumptive patients have been taken by Dr. Kuss, of Paris, to the Vallot Observatory, near the summit of Mont Blanc, for the purpose of ascertaining the effect of rarefied air on their lungs. The patients remain in the open for the greater part of the twenty-four hours in every kind of weather.

THE next meeting of the International Congress of Ophthalmology is to take place at Lucerne from September 19 to 21 of next year, under the presidency of Prof. Dufour. According to the official circular which has recently been distributed, no papers are to be read, but such, if written in English, French, German, or Italian, and sent with the admittance fee before May 1 next to Prof. Mellinger, of Basle, will be printed and grouped according to their subjects, and this printed report will be sent to each member with his admission card at least two weeks before the date appointed for the opening of the congress. At the meetings the authors of the papers will have the opportunity of stating the conclusion of their respective papers in a few words, and the discussion will then commence. Members present who are interested in the subject of the paper will, of course, have had the opportunity of reading the paper before the opening of the congress. The discussions will be printed and published at the close of the congress, and possibly papers received too late to be printed before the opening of the congress will also be discussed and printed with the discussions. The afternoons of the congress will be devoted to practical demonstrations.

THE Paris Society of Pharmacy is to celebrate its centenary on October 17, and in connection with it an historical account of the Society has been prepared and will be read by Prof. E. M. Bourquelot, the general secretary, at a public meeting. This history, together with other original matter that may be supplied by members of the Society, will, says the *Chemist and Druggist*, form the material of a book which will be published later. The work will also contain the portraits and biographies of leading pharmacists and chemists who have been connected with the Society, such as Nicolas Houël, the founder, the "Citizen" Trusson, one of the last directors of the Free Society of Pharmacists, Parmentier, Vauquelin, Bouillon-Lagrange, and others.

A MEETING was recently held in America, under the chairmanship of Dr. D. C. Gilman, to promote a proposed memorial to the late Major Reed, M.D., well known for his work in connection with the discovery of the mode by which yellow fever has been spread, and the suppression of the disease. According to *Science* the meeting decided

that an effort should be made to raise a memorial fund of 25,000 dollars or more, the income to be given to the widow and daughter of Dr. Reed, and that after their decease the principal shall be appropriated either to the promotion of researches in Dr. Reed's special field, or to the erection of a memorial in his honour at Washington.

PARTICULARS, according to the *Lancet*, have been received of the medical results of the expedition of investigation to the Bahamas which was sent out some time ago by the Johns Hopkins University and the Baltimore Geographical Society, from which we glean the following. Skin diseases, and especially leprosy, were found to be very prevalent. No effort is made to prevent the spread of leprosy, and many instances were noted where persons suffering from that disease were engaged in the sale of provisions, in piloting vessels, and in other pursuits. No cases of yellow fever were discovered, and but two cases of malaria were recognised. Many species of mosquito were secured for subsequent study. A special feature of the work of the medical department was the study of the degenerates of Abaco, descendants of the Torgs, who closely intermarry.

ACCORDING to the *Times* a prehistoric British barrow has just been opened at Martinstown, Dorset. The barrow contained worked flints, a quantity of pottery, and a large British urn inverted on a slab of stone, covering some cremated remains which had been wrapped in a rough material of cloth or rushes, the texture of the weaving of which was still traceable. In another barrow close by have been found a vase and a bronze knife with a portion of a willow handle.

ON this day week, September 10, a storm of unusual violence advanced over the central portion of the British Islands, causing enormous damage in its passage over sea and land. The *Daily Weather Report* issued by the Meteorological Office for 8h. a.m. of that day showed that a depression lay to the westward of the Irish coasts; by 6h. p.m. the disturbance reached the Irish Sea, and had advanced at the rate of about fifty miles an hour, while by the evening it had spread over nearly the whole country. So rapid was its rate of progression that the *Daily Weather Report* of the morning of September 11 showed that the centre of the storm had reached the north of Holland. The destruction was so general that it seems somewhat invidious to refer to individual instances. We merely quote two cases to illustrate its violence—the demolition of the solid breakwater at Dover, and the uprooting of trees in the vicinity of London that had withstood the storms of a hundred years. During the passage of the gale the barometer fell at the unusual rate of more than 0.1 inch an hour. The velocity of the wind to the southward of the centre of the storm was much greater than to the northward; near the mouth of the Channel on the evening of September 10 it reached nearly 70 miles an hour. The rainfall measured in the twenty-four hours ending on Friday exceeded an inch and a half in the north-west, and an inch and a quarter in the east of England.

THE September issue of the Meteorological Office pilot chart contains, in addition to the twelve maps showing the tidal streams round the British Isles, a reproduction of Dr. Hermann Berghaus's chart of cotidal lines round our own and the North Sea coasts, with explanatory remarks by Prof. G. H. Darwin. To render the information more complete to the mariner, there is a table giving the times of high water at Dover throughout the month. Another addition deals with a proposal to alter the steamship route between the Bristol Channel and Jamaica. A comparison has been

instituted to show the merits and demerits of the Great Circle track, 3524 miles; the Rhumb track, 3603 miles; and the suggested route *via* the Azores and the Mona passage, 3722 miles. The conclusion arrived at is that, "taking into consideration the wind direction, the wind force, and the sea-surface currents, it seems safe to assume that the Azores routes will be covered by a vessel at her usual speed in an interval of time certainly not greater than that occupied by the same ship in following either the Great Circle route or the Rhumb track, and probably in less."

THE report of the Meteorological Commission of Cape Colony for the year 1901 shows a considerable falling off as regards the number of stations, compared with that of the previous year, owing to the difficulties of observation and communication under the operation of Martial Law within the colony. Nevertheless, the commission has been able to publish rainfall statistics from 436 stations, excluding those connected with the Kenilworth Observatory, and a large amount of valuable general meteorological observations. Many of the stations destroyed or discontinued were situated in the more sparsely populated districts, and it is estimated that it will take years to recover the lost ground. The commission reports, however, that there is an awakening sense of the importance of meteorology among the governing bodies of the other British South African territories, and that, in spite of the troublous times recently passed through, the prospects of the development of meteorological observations are much brighter now than ever they have been. We wish the commission success in the continuation of its very useful operations.

PARTICULARS are given in the *Scientific American* of an ingenious invention which has been brought out to notify automatically the outbreak of fire, and to indicate to the fire stations the name and position of the building which is in danger. Of the device, which is the invention of M. Emile Guarini, the essential feature is a thermometer which is so arranged that it is capable of releasing a toothed wheel which serves to transmit the requisite information. When the heat reaches the thermometer and the mercury rises in the tube until it reaches the mark indicated by 42° on the Réaumur scale it touches a small platinum wire inserted in the upper end of the tube, and thereby closes an electric circuit including an electro-magnet. Thus excited the magnet attracts and holds its armature. This motion releases a toothed wheel of peculiar construction, which, by means of a weight or spring, is made to revolve, and produces during each revolution a series of makes and breaks upon a contact piece placed in its path. A connected induction coil describes the exact location of the endangered property to the neighbouring fire station, where the message is registered by a Morse apparatus, and the attention of the attendants is directed by an electric gong to the signal received. An incandescent lamp also glows when the alarm is sounded.

It will not be owing to want of help from the Imperial Department of Agriculture if West Indian planters fail to get profitable returns from their land. In the last number of the *West Indian Bulletin* the value of ground nuts, Eucalyptus trees, and the bay tree is brought to notice. Mr. W. G. Freeman has collected much practical information on the subject of ground nuts, known also as monkey nuts and pea nuts. Besides furnishing oils of which the best grades are nearly equal to olive oil, the ground nut, *Arachis hypogaea*, offers another source of profit, since it may be manufactured into oil-cake, for which there is evident demand, as at the present time large quantities are

imported. For the manufacture of bay oil and bay rum the tree *Pimenta acris* has a considerable value; it is indigenous to many of the islands, but must be distinguished from the tree known as "bois d'Inde citron" in Dominica, the product from which is inferior.

JUDGING from a circular which has been received from the Forestry Bureau of the U.S. Department of Agriculture the lumbermen of the United States of America do not yet thoroughly recognise that their interests coincide with those of the forester. Of the three papers included in the circular, the first is an address delivered by President Roosevelt in which he states that "the forest problem is in many ways the most vital internal problem in the United States." Chief-forester Pinchot discusses the mutual position of the lumberman and the forester.

WE have received a chart of fossil shells found in connection with the seams of coal and ironstone in north Staffordshire, drawn up by Dr. Wheelton Hind and Mr. J. T. Stobbs. There are columns showing the strata met with in the Potteries and Cheadle coal-fields, but the information relates chiefly to the former and more important district. The species figured are chiefly Mollusca, and they are arranged alongside the divisions which they characterise. The chart is published by the North Staffordshire Institute of Mining and Mechanical Engineers, and it should prove of practical use to mining students and to those engaged in sinking for coal.

DR. J. F. WHITEAVES has described some additional fossils from the Cretaceous rocks of Vancouver, and has given a revised list of the species therefrom, in the fifth and concluding part of his first volume on Mesozoic fossils (Geol. Survey of Canada, August). A number of Crustacea, of Cephalopoda and other Mollusca, and Brachiopoda are figured. Echinoderms are represented only by fragments, and corals and Polyzoa by two or three specimens. A few fish-remains occur, including *Lamna appendiculata*, which extends through the Upper Cretaceous strata, and ranges from northern Europe to New Jersey and Queensland.

DR. ERNEST W. SKEATS contributes an essay on the chemical composition of limestones from upraised coral islands, with notes on their microscopic structure (*Bull. Museum Comp. Zool., Harvard Coll., vol. xlii.*). The rocks consist of true coral reefs and of fragmental strata made up of organic debris. The author, after describing the materials, briefly discusses the relation of the distribution of magnesium carbonate in the limestones to the question of the origin of dolomite. It seems probable that the introduction of magnesium into the rocks takes place from the waters of lagoons under certain favourable conditions.

In addition to his presidential address on the distribution of life in the Antarctic, Dr. H. Woodward contributes a paper on East Anglian geology to the *Transactions* of the Norfolk and Norwich Naturalists' Society for 1902-1903.

WE have received two parts of the *Bulletin International* (Rosprawy Ceske Ak. Praze) for 1903. Among their contents, reference may be made to an important article, by Dr. O. Völker, on the development of the pancreas in the amniote vertebrates, and to a second, by Prof. J. Janošik, on that of the blood corpuscles in the same great group.

A LENGTHY illustrated account of the "Bathymetrical Survey of the Fresh-water Lochs of Scotland" appears in the current *Geographical Journal*, the introductory portion of which gives the history of the origin of the survey; this is followed by particulars of some six of the lochs. The *Geographical Journal* is to publish the bathymetrical maps



and the other observations of the survey staff, and the series of articles will, it is hoped, when completed, form a worthy memorial of the late Mr. F. P. Pullar.

THE September issue of the *American Journal of Science* contains, as frontispiece, a process portrait of Prof. J. Willard Gibbs, and an obituary notice of Prof. Gibbs by Prof. H. A. Bumstead. The number also contains an article by Mr. J. Stanley Gardiner, of Cambridge, on "The Origin of Coral Reefs as shown by the Maldives."

THE September issue of the *Popular Science Monthly* (New York) is full of interesting matter, and contains, among other contributions, articles on "Palm and Sole Impressions and their use for Purposes of Personal Identification," by Prof. H. H. Wilder; "Theories of Sleep," by Dr. P. G. Stiles; "Mosquitoes and Suggestions for their Extermination," by W. L. Underwood; and part iv. of a series of articles by Prof. J. A. Fleming, F.R.S., on "Hertzian Wave Wireless Telegraphy."

MESSRS. WATTS AND CO. have issued, for the Rationalist Press Association, a reprint, at sixpence, of the first edition of "The Origin of Species." It will be remembered that an edition of the final form of this great classic was brought out not long ago by Mr. Murray in paper covers at one shilling.

THE additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*) from West Africa, presented by Mr. C. Pells; two Masai Ostriches (*Struthio camelus*, var. *massaicus*) from East Africa, presented by Mr. A. Marsden; two Grey-breasted Parrakeets (*Myopsittacus monachus*) from Monte Video, presented by Mr. C. Martin; a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, two Mozambique Monkeys (*Cercopithecus pygerythrus*) from East Africa, a Black-striped Wallaby (*Macropus dorsalis*), a Black-tailed Wallaby (*Macropus walabates*), a Rufous Hare Wallaby (*Lagorchestes hirsutus*) from New South Wales, two Black-headed Caiques (*Caia melanocephala*) from Demerara, an Australian Barn Owl (*Strix delicatula*), a Winking Owl (*Ninox connivens*), a Burton's Lizard (*Lialis burtoni*), a Limbless Lizard (*Pygopus lepidopus*) from Australia, a Javan Loris (*Nycticebus javanicus*) from Java, two Grey Monitors (*Varanus griseus*) from North Africa, two Muriated Lizards (*Amphibolurus muricatus*) from Australia, deposited.

### OUR ASTRONOMICAL COLUMN.

SEARCH-EPHEMERIS FOR COMET 1896 v. (GIACOBINI).—Herr M. Ebell contributes to No. 3898 of the *Astronomische Nachrichten* a second portion of the ephemeris for comet 1896 v. which he commenced in No. 3881 of the same journal. This ephemeris takes as the time of perihelion June 22.5, 1903, but Herr Ebell also gives ephemerides in which the time of perihelion passage is taken as June 6.5 and July 8.5 respectively.

*Ephemeris 12h. M. T. (Berlin). T = June 22.5 1903.*

1903		h.	m.	s.	δ	log r	log Δ	Bright- ness.
Sept. 26	...	4	4	43	... + 14 12.2	...	0.2492	0.0177 ... 2 66
" 30	...	4	5	48	... + 13 29.7	...		
Oct. 4	...	4	6	9	... + 12 45.0	...	0.2604	... 0.0111 ... 2 61
" 8	...	4	5	47	... + 11 59.0	...		
" 12	...	4	4	45	... + 11 12.2	...	0.2717	... 9.9973 ... 2 64
" 16	...	4	3	4	... + 10 24.9	...		
" 20	...	4	0	49	... + 9 37.8	...	0.2831	... 0.0076 ... 2 39
" 24	...	3	58	3	... + 8 51.4	...		
" 28	...	3	54	51	... + 8 6.5	...	0.2943	... 0.0130 ... 2 21

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INTENSITY OF SPECTRAL LINES.—Circular No. 72 of the Harvard College Observatory is devoted to the explanation of a scheme, proposed by Prof. Pickering, for the formation of a uniform universal method of recording the absolute intensities of spectral lines.

Comparative intensities are easily determined, in the case of bright lines by the bolometric method, in the case of dark lines by using the bright background as the standard unity intensity. Absolute values, however, are much more difficult to determine, and two methods offered themselves to Prof. Pickering's choice. First, the determination once for all of the intensities of certain well-known lines; secondly, the construction of an artificial standard with which all lines might be directly compared; he decided to use the second method.

A standard scale was constructed in which each line was 1.26 times as wide as the one next below it, so that the logarithms of their widths differed by 0.1, and the scale was then reduced rather more than twenty times and printed on sensitised paper, the haziness, which is characteristic of real spectral lines, being produced by inserting various thicknesses of white paper between the negative and the sensitive paper.

To standardise this prepared scale the line E of the Fraunhofer spectrum on Higgs's charts was used, and the intensities of thirty-six lines between  $\lambda$  5261.8 and  $\lambda$  5276.2 were measured, on the scale, on five different charts, and the five independent scale readings, their mean, the residuals from the mean and the width of each line in Ångström units, are given in the table accompanying Prof. Pickering's paper.

A PROVISIONAL CATALOGUE OF VARIABLE STARS.—No. 3 vol. xlviii. of the Harvard College Observatory *Annals* is devoted to a provisional catalogue of variable stars in which reference is made to some 1227 different variables. The catalogue has been prepared from a card-index of variable stars, commenced by Prof. W. M. Reed in 1888, and carried forward by Miss A. J. Cannon since 1900, which now contains about 34,000 cards referring to observations of variables.

A new notation has been adopted after grave consideration in this catalogue. Each star is designated by a number containing six figures, which are printed in ordinary type if the star is in the northern hemisphere and in italics if it is in the southern. The first two figures give the hours and the second two the minutes in the R.A., whilst the last two give the degrees in the declination; thus the designation of the first star in the catalogue (V. Sculptoris) is 000339 which, when translated, gives the approximate position of the star as R.A. = 0h. 3m., Dec. = -39°.

The catalogue also gives the Chandler number, the name of the star or its constellation, the D.M. number, the exact position for 1900, the chief particulars of the elements, the class of the variable and of its spectrum, and the date of discovery, with the name of the discoverer, for each variable.

MASS OF MERCURY.—In No. 3897 of the *Astronomische Nachrichten*, Prof. T. J. J. See, of Washington, gives the results of his recomputation of the mass of Mercury, and points out, *en passant*, the importance to workers in celestial mechanics of obtaining the truest possible value of this constant.

The latest measurements of the planet's diameter have slightly increased the former values, and Prof. See adopts 6" 00 as the most probable value of the diameter at unit distance; this gives an absolute diameter of  $4351 \pm 72$  km. and a resulting mass of  $m = 1 : 14868.58 \pm 743427$ , which Prof. See adopts as the definite value. The mean specific gravity of the planet, with this mass, is 3.09, and this conforms very well with the other densities obtaining in the solar system.

CORRECTIONS TO EXISTING STAR CATALOGUES.—Since the publication of the "Catalogue of Reference Stars in the Zone +46° to +55°," by the Royal Observatory of Catania, Signor G. Boccardi has discovered a number of errors in various existing catalogues. These are set forth and their corrections given in a paper communicated by him to No. 3898 of the *Astronomische Nachrichten*; they include errata in the coordinates and in the precessional corrections.

Twelve catalogues are dealt with, including, among others, "The Radcliffe Catalogue of 6317 Stars (1845-0)."